Organic Reactions Worksheet

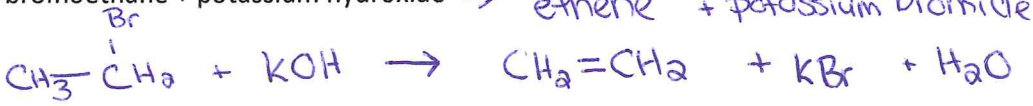
1. Classify the following organic reactions:
   a. pent-2-ene + hydrogen gas → butane addition
   b. methanol + propanol → methoxy propane + water condensation
   c. methyl butanoate + sodium hydroxide → sodium salt of butanoic acid +methanol saponification
   d. benzene + iodine gas→ iodobenzene + hydrogen iodide substitution
   e. but-2-ene + oxygen gas → carbon dioxide + carbon + water combustion → incomplete
   f. ethanol + $KMnO_4$ → ethanal + water oxidation
   g. hexanoic acid + dimethyl amine → N,N-dimethylhexanamide + water condensation
   h. methane + hydrochloric acid → chloromethane + hydrogen gas substitution
   i. ethyne + oxygen gas → carbon dioxide + water complete combustion
   j. ethane + fluorine gas → ~~bromo~~ethane + hydrogen fluoride substitution
      Fluoro

2. Draw structural or skeleton diagrams for the reactions below. Include names of reactants and products. If no reaction occurs, write "No Reaction". If more than one product is possible indicate which the major and minor products.

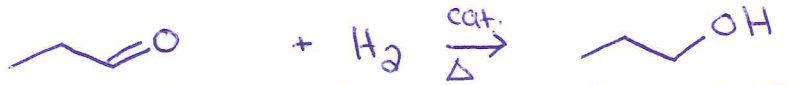
   a. butanoic acid + methanol →

   methyl butanoate + water

   b. 2-bromoethane + potassium hydroxide → ethene + potassium bromide + water



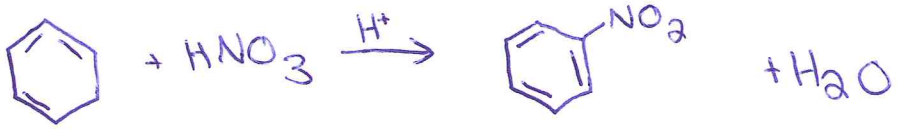
   c. Formation of a propanol from corresponding aldehyde



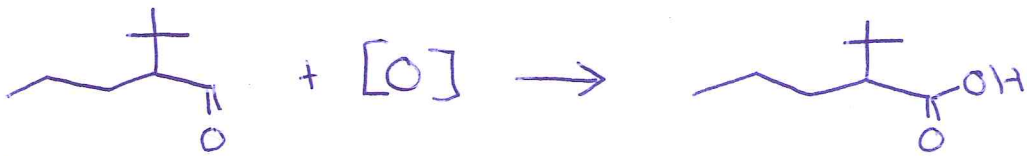
   propanal + hydrogen gas → 1-propanol

   d. Formation of N-methyl-N-ethylbutamine through hydrolysis

   e. Benzene + nitric acid

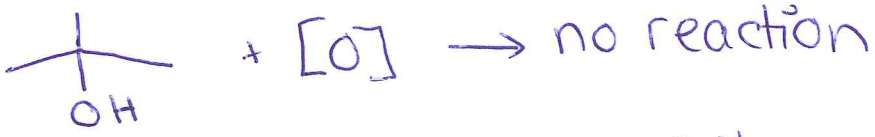


   f. Formation of 2-t-butylpentanoic acid through controlled oxidation



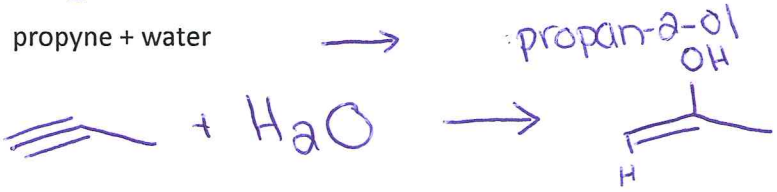
   2-t-butylpentanal → 2-t-butylpentanoic acid

g. Controlled oxidation of 2-methylpropan-2-ol

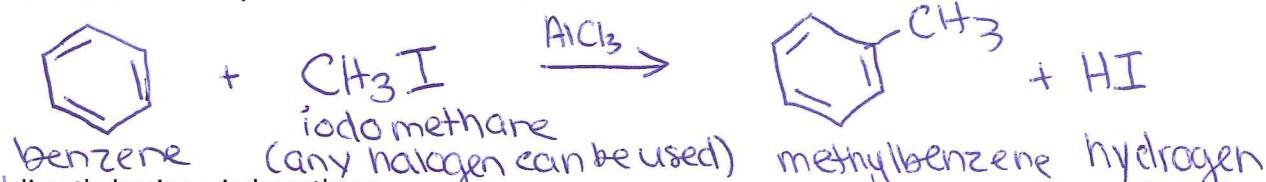


h. propyne + water

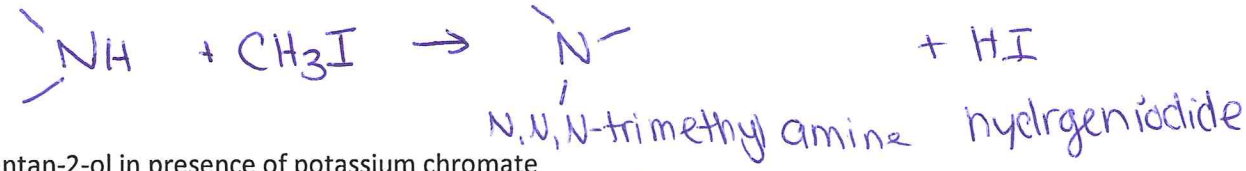
propan-2-ol



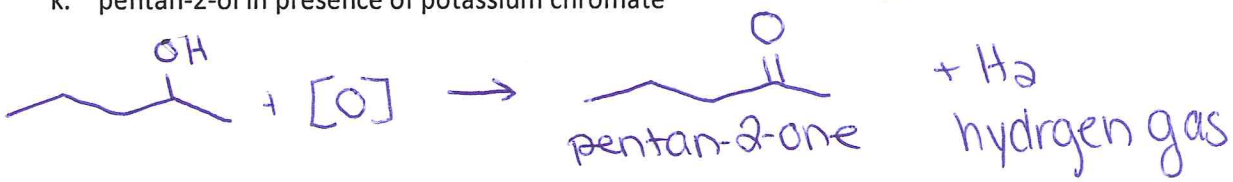
i. Formation of methylbenzene from benzene



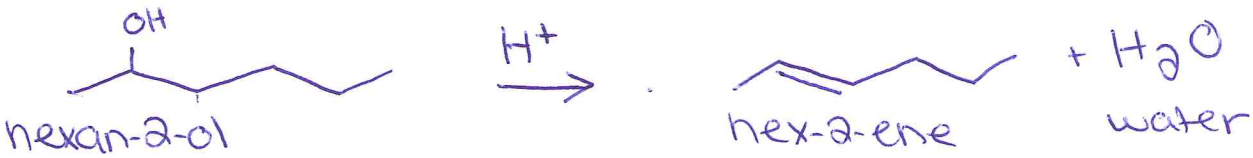
j. N,N dimethylamine + iodomethane



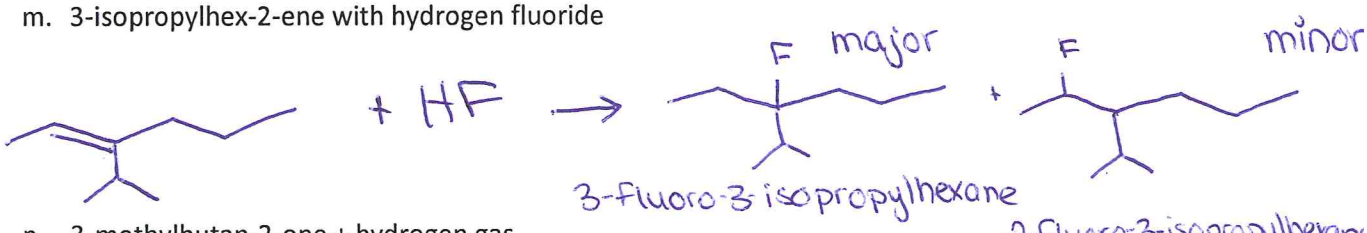
k. pentan-2-ol in presence of potassium chromate



l. Formation of hex-2-ene from corresponding alcohol



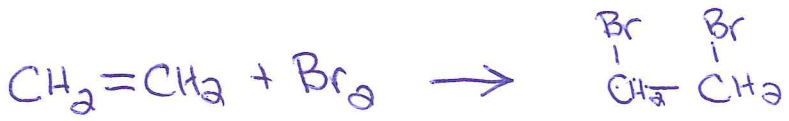
m. 3-isopropylhex-2-ene with hydrogen fluoride



n. 3-methylbutan-2-one + hydrogen gas

3-methylbutan-2-ol

o. Formation of 1,2-dibromoethane from an alkene



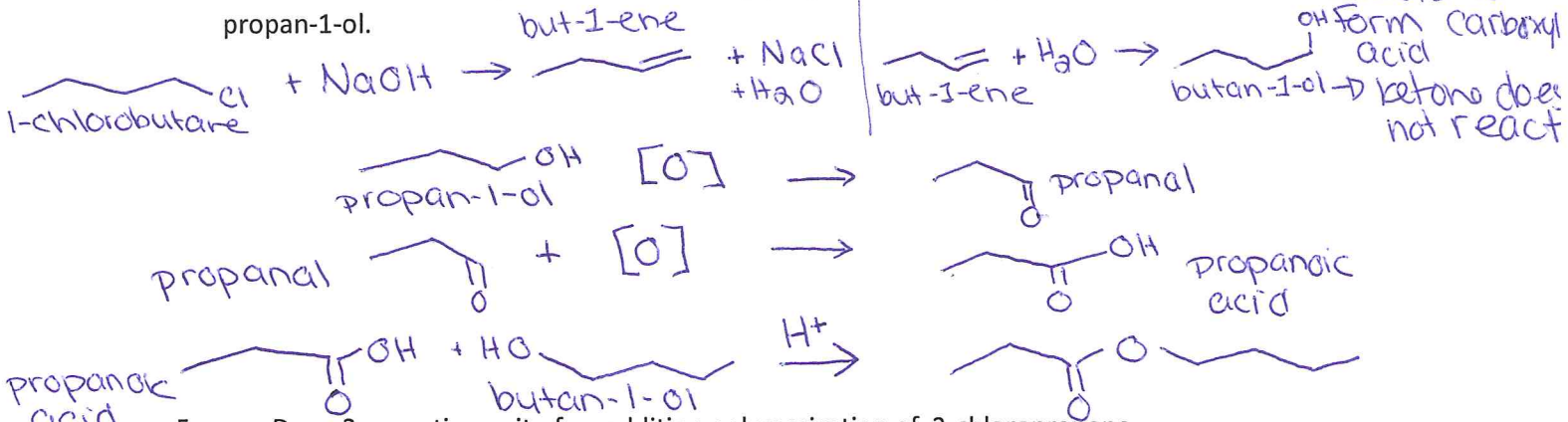
ethene bromine

3. You were asked to identify 4 chemical bottles because the labels have fallen off. The chemicals are butan-1-ol , butan-2-one , butanal and methyl propanoate. What 2 tests can be done to determine the correct labels? Explain how the results would indicate which chemical was which.

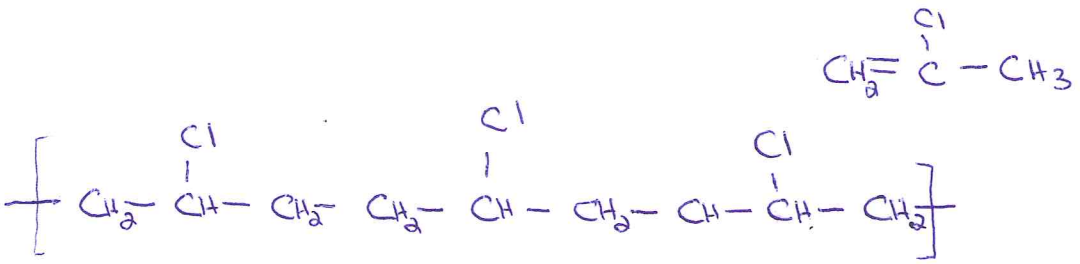
1→ boil them
The highest b.p. indicates strongest intermolecular forces butan-1-ol would boil at the higest temp because it can H-bond with itself. ketone would be second highest, then aldehyde then ester. C=O makes dipole-dipole bonding possible. the C-O in the ester doesn't allow for as much dipole-dipole bonding because two Os are close together.

2- ketone + aldehyde have very similar b.p. so do clearly identify them they could be reacted with an oxidizing agent → aldehyde reacts to form carboxyl acid → ketone does not react

4. Write a series of equations to make butyl propanoate starting from 1-chlorobutane and propan-1-ol.

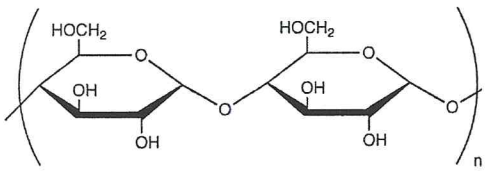


5. Draw 3 repeating unit of an addition polymerization of 2-chloropropene.



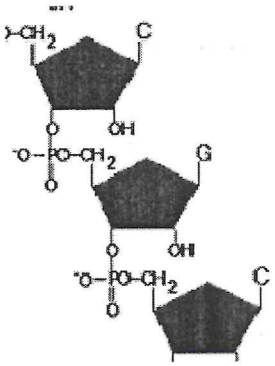
6. Which type of natural polymer is show here?

a)



glucose

b)



nucleotides

c)